



DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5001

IN REPLY REFER TO:

8370
Ser 4081CZ/0011
24 JAN 2000

From: Commander, Crane Division, Naval Surface Warfare Center
To: Naval Ordnance Safety and Security Activity
Attn: (b)(6) (N7151), Farragut Hall (Bldg. D-323)
23 Strauss Avenue, Indian Head, MD 20640-5555

Via: NAVSURFWARCENDIV, Code 405, (b)(6)

Encl: (1) Photographs of the Artic M14
(2) Initial Safety and Functioning Testing Results
(3) Preliminary Hazard Analysis

Subj: DATA FOR APPROVAL FOR OPERATIONAL ASSESSMENT OF ARTIC
M14 RIFLE WITH SUPPRESSOR

1. Subject information is provided as required in requesting approval for an Operational Assessment by Naval Special Warfare operators while conducting winter warfare training at (b)(5)
2. As a result of request by SEAL Team 2 and the funding authorized by the Naval Special Warfare Command N432, Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) contracted with Sage International, Inc., to have ten M14 stocks converted to an Artic configuration. Also, a prototyping contract was let with J. M. Enterprises and D. D. Ross Company to develop two prototype M14 rifles with shortened barrels and other features for use in winter warfare operations by Naval Special Warfare SEAL Teams.
3. The M14 rifle has a long history with the US military. The weapon is type classified by the US Army and has been in service with the Naval Special Warfare SEAL Teams since their inception. The Artic M14 is simply a M14 with a collapsible stock, a shorted barrel and fitted with a flash suppressor capable of accepting a quick detach 7.62mm suppressor. Enclosure (1) details all the differences between the Artic M14 and the standard US Army type classified M14.
4. The initial safety and function testing of the Artic M14 with suppressor has been completed. Test results are summarized in Enclosure (2).

Subj: DATA FOR APPROVAL FOR OPERATIONAL ASSESSMENT OF ARTIC
M14 RIFLE WITH SUPPRESSOR CONT'D

5. Based on these test results, a Preliminary Hazard Analysis (PHA) is being provided as Enclosure (3). This analysis does disclose one area of concern that will require correction prior to any fielding of the Artic M14 weapon. It has been noted in the PHA that the quick detach flash suppressor that was utilized on these prototype Artic M14's is capable of accepting the standard M4 SOPMOD suppressor. While SEAL Teams do not normally use the M4 Carbine in the Arctic, if the operator were to inadvertently attach the M4 suppressor to the Artic M14 weapon and fire a round, the projectile would strike the 5.56mm diameter baffles. This could cause the suppressor to detach from the muzzle and potentially allow a bullet or broken baffles to exit through the side of the suppressor.

6. Even in this unlikely scenario of injury to the shooter is improbable due to forward direction the projectile and gases. All the debris from such a ruptured suppressor would likely travel away from the shooter in an outward conical pattern. Any possible hazard would be to those other operators who may be down-range of the weapon or in close proximity to the suppressor. This minor risk was identified in an identical suppressor for AK 47's. The .30 caliber suppressor was approved for demonstration last year (see NAVORDCEN Ser N71/551, dated 6 Aug 99, Enclosure 1, Weapon 7).

7. Request approval for SEAL Team 2 to conduct an Operational Assessment of the Artic M14 rifle with suppressor. This assessment will involve Naval Special Warfare personnel and will take place at ranges at or in the area surrounding (b)(5) during month of February 2000. A total of two Artic M14's with 7.62mm KAC QD suppressors will be sent to (b)(5). Ammunition is restricted to in-service 7.62MM NATO cartridges, with the exception of M64 Grenade Launcher Cartridge.

8. No additional training is required for SEAL Team 2 to fire these Artic M14 weapons and suppressors due to the fact that the weapons operate in a manner identical to the current type classified M14 rifles, and the suppressors attach in a manner identical to the M4 SOPMOD QD suppressors. A warning notice will be supplied in the shipping containers attached to both the Artic M14 and the KAC QD suppressors stating the hazards associated with attaching a M4 suppressor on the Artic M14 rifle. Prior to evaluation, NAVSURFWARCENDIV Crane will be in direct telephone contact with SEAL Team 2 to ensure they understand this caution. At the conclusion of the Operational Assessment, all assets will be returned to NAVSURFWARCENDIV Crane.

Subj: DATA FOR APPROVAL FOR OPERATIONAL ASSESSMENT OF ARTIC
M14 RIFLE WITH SUPPRESSOR CONT'D

9. Therefore, it is requested that approval be given for SEAL Team 2 to conduct the Operational Assessment of the Artic M14 during their winter warfare training. In order to meet SEAL Team 2 training schedule, it is requested that approval be received by 1 Feb 00.

10. NAVSURFWARCENDIV Crane point of contact is (b)(6)
Small Arms Weapons Branch Manager, Code 4081, telephone DSN (b)(6)
or commercial (b)(6)

(b)(6)

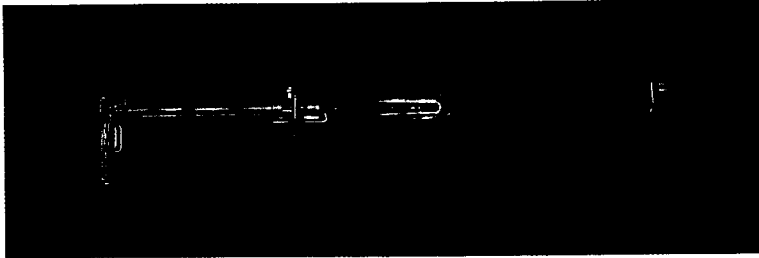
By direction

Copy to:
COMNAVSPECWARCOM (N43)
PEO (EXW) (PMS325J)

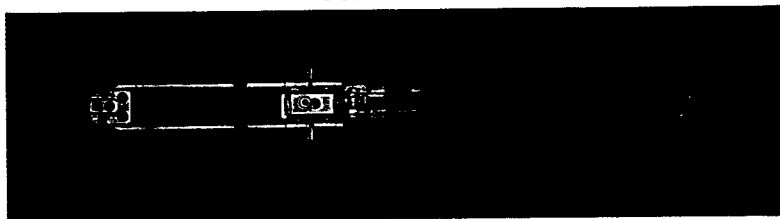
M14 -Arctic Prototype Modification Descriptions

1. Collapsible M14 Stock (Prototype for User Field Evaluation)

SIDE VIEW



TOP VIEW



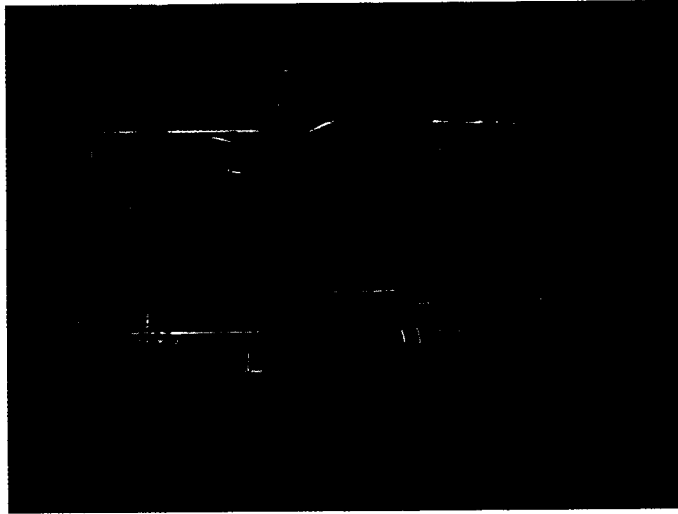
Exact description of modification to standard stock:

1. The prototypical model of this stock was designed and fabricated by (b)(6) of Code 408, NSWC Crane. 200 rounds were fired in this model to ensure safety.
2. Sage International, Inc., under technical direction of NSWC Crane, fabricated 10 additional prototypes. GFE was 15 standard M14 fiberglass stocks and the prototypical model of the collapsible M14 stock.
3. Rear portion of standard stocks were removed at a point .30 inches behind the trigger guard, cut along an inclined plane of 345 degrees, measured from vertical index.
4. 5/8" radius relief cuts were routed to a length of 5.7" on each side of the stocks.
5. Rear portion of stocks were reinforced with 2 hex head reinforcing crossbolts (3/16" Diameter)
6. Commercial collapsible stocks (Sage International, Inc.) were attached to the cut surface with suspended mounting hardware in a copolymer/metal particle matrix.

Collapsible Stock with Basic M14



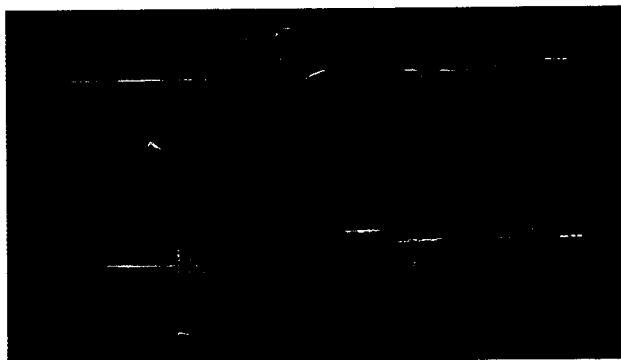
2. Prototype M14 Collapsible Stock with Shortened M14



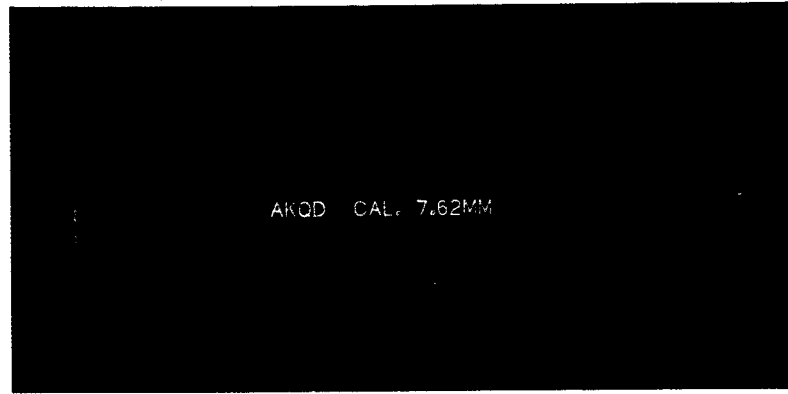
Exact description of shortened M14:

1. Under technical direction of Code 408, NSWC Crane, D. D. Ross Company conducted gunsmithing work in conjunction with J. M Enterprises. GFM was two Navy standard M14's.
2. Barrels of the two Navy standard M14's were removed.
3. High-quality medium-weight commercial match-grade barrels (Douglas chrome-moly, 4 groove, 1-10 twist) were shortened to 18" overall length.
4. Fresh barrel crowns were cut on the match barrels.
5. Muzzles of the match barrels were threaded to 1/2"-28 TPI.
6. Barrels were attached to M14 receivers and headspaced.
7. Gas cylinder/piston ports were opened to .062" to accommodate reliability for shortened dwell time, and affixed to match barrels.
8. Commercial (J. M. Enterprises) MILSPEC 1913 rails and front sight assemblies, one open guard and one ring guard, were installed. This is the only difference in the two prototypes.
9. SOPMOD standard KAC Flash Suppressors were installed to allow attachment of KAC .30 caliber QD Sound Suppressor. This is a commercial item analogous to the SOPMOD standard 5.56mm suppressor.

Shortened M14's with Stocks Extended and Suppressors Attached



***Closeup of KAC .30 Caliber Sound Suppressor
Showing Identifying Markings***



ARTIC M14 WITH SUPPRESSOR SAFETY AND FUNCTIONING TEST

20 January 2000

TEST: Function and Safety firing of short-barreled collapsible stocked M14 prototypes.

Modifications: Shortened (18 inch) match grade barrels, modified gas ports on barrels (for improved cold weather reliability), integrated extended 1913 mounting rail, new front sight modification at gas cylinder. The contractor making the weapon modifications fired each weapon for a minimum of 50 rounds for accuracy and function prior to delivery of the weapons to NSWC Crane.

ARTIC M14 WITH SUPPRSSOR TESTING						
Weapon	Ammo	Suppressor	Selector setting		Rnds	Remarks
			Semi-automatic	Automatic		
60294	M80			✓	40	
60294	M80	X99003		✓	20	See Note (1)
60294	M80		✓		120	See Note (2)
						Total 180 rounds
32934	M80			✓	40	
32934	M80	X99004		✓	20	See Note (1)
32934	M80		✓		120	See Note (2)
						Total 180 rounds

1. Indoor Range Testing (25m). 120 rounds were fired (60 per gun on full auto). 20 rounds were fired without the suppressor, resulting in one failure to eject (stovepipe - case caught between op-rod and sight rail) on gun 60294. With the sound suppressors installed, multiple failures were seen (60294 had 5, 42934 had 2), as the ejected case got jammed between the op-rod and the sight rail (stovepipe). The bolt catch engaged under recoil locking the bolt open 2 times when rounds still remained in the magazine on gun 60294. The short barreled M14's were no more difficult to control on automatic than a standard M14. The sound suppressors caused an excessive rate of fire resulting in the malfunctions noted and severe gas blow back on the shooter's forehead from the chamber. It is recommended that the operator wear eye protection when firing the Artic M14 with the sound suppressors attached.

2. Underground Range Testing (100 yards). Rifle 32934 was used in evaluation of an in chamber bore sighting laser with the firing of a few rounds of match ammunition (M852). There were no malfunctions. A Reflex Sight, an ACOG, and an AN/PVS17 were installed on the rail of one gun to check for compatibility (all are rather too high for optimal use and too far forward - too short eye relief - except for the Reflex Sight, which does not depend on eye relief). Both M14's were fired semi-auto for 6 magazines each (120 rounds per gun). One magazine used failed to chamber the last round leaving it in the magazine (once in each M14). Two of the cases caught between op-rod and mount base occurred on gun 32934 (once in each of the first two magazines fired). Gun 60294 had one of the same type stovepipe malfunctions in the last magazine fired (out of 6). Generally at least one round per magazine caused a severe flash but most rounds had minimal flash. The stocks remained solid and functional throughout the testing. The firing jarred loose the standard front sight used on gun 60294. It was not checked for tightness prior to firing.

3. Conclusions/Recommendations. There were no safety-related malfunctions on the two modified M14's. It is recommended that the weapons have some minor modifications made to enhance reliability (eliminate stovepipe problems). It is recommended that if the weapon is to be used primarily with a sound suppressor that a special gas piston be used with a smaller inlet hole to improve function and reduce gas blowback. These modifications are not necessary for any safety-related issues. The weapons are deemed safe and ready to send out for user evaluations as required. The prototype collapsible stocks are also ready for field evaluation (no safety issues).

(b)(6) Code 4081
SOPMOD Kit Engineer

SYSTEM: Artic M14 w/ suppressor SUBSYSTEM: _____ OPERATIONAL PHASE: All REVISION: _____	<h2 style="margin: 0;">PRELIMINARY HAZARD ANALYSIS</h2>	ANALYST: (b)(6) REVIEWER: _____ DATE: January 24, 2000 PAGE: 1 OF 1
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NO.	HAZARD DESCRIPTION	CAUSE	HAZ CAT	HAZARD CONTROL	REMARKS
001	Accidental discharge	Stray inert particles strike personnel due to loaded weapon being dropped on ground. Stray inert particles strike personnel due to loose blank round dropped on hard surface and initiating primer.	ID IID	A. Insure proper training/certification of assigned personnel. B. Adhere to established procedures for small arms safety. C. Maintain qualified supervision. A. Insure proper ammunition handling procedures are adhered to IAW OP-5.	M14 has been in service for years, no known safety related problems related to dropping the weapon
002	Accidental discharge due to cookoff of a chambered cartridge in a hot weapon	Chambering a round or encountering a misfire after excessive number of rounds through weapon without cooling.	ID	A. Insure personnel are aware that the weapon temperature rises faster when ambient air is warmer than room temp. B. Adhere to established procedures for small arms safety. C. Ensure the weapon is pointed in a safe firing zone. D. Maintain qualified supervision.	Operator should maintain awareness of cook off potential of hot weapon, Artic M14 has heavier barrel which lessens the chance for cook off over that of the conventional M14
003	Bullet impacting baffle of suppressor	Live round fired when suppressor is not fully threaded on to barrel. Suppressor material begins to droop when fired excessively without intermediate cooling. Operator attached incorrect caliber suppressor	 IID	A. Personnel shall ensure that suppressor is securely threaded on to barrel prior to firing. A. Insure gunner adheres to safe and proper weapon operation IAW manufacturer's operating manual. B. Adhere to established procedures for small arms safety. C. Maintain qualified supervision. A. Personnel shall ensure that suppressor is the correct make and model approved for the M14 Artic rifle B. Future production rifles will utilize a method of attachment unique to the M14 Artic rifle C. Operators will be specially briefed on this potential hazard	Stray projectile or fragments could potentially strike personnel. Note: Currently the prototype M14 Artic Rifles are fitted with the same attachment for the M4 suppressor
004	Clearing of cartridge misfire	Cartridge does not fire after firing pin impact.	IIID	A. Follow hangfire procedure as follows. Wait five seconds in case of hangfire. B. After 5 seconds, open chamber, and eject the round. C. Place misfired cartridge in a container of water.	Weapon should always be pointed in a safe direction according to range SOP.
005	Cleaning of weapon with solvent or bore cleaner	Personnel injury due to contact with skin or eyes from cleaning with solvent liquid and vapors. Personnel injury due to vapors from inhalation of solvent.	IIIC IIID	A. Use protective gloves and eye wear when using solvent. B. Handle solvent with care to avoid spillage. C. Render first aid when required. D. Use in well-ventilated area.	
006	Impacting a target too close to the gunner	Projectile strikes target, fragments ricochet striking gunner.	IIID	A. Weapon should always be pointed in a safe direction according to range SOP. B. Ensure that all personnel are adequately shielded.	
007	Gunner burned by hot barrel or hot suppressor	Gunner grabs or touches hot barrel or suppressor after sustained firing.	IIIC	A. Use caution when removing hot suppressor B. Use protective gloves/clothing. C. Render first aid when required.	
008	Gunner burned by hot suppressor	Gunner grabs or touches hot suppressor after sustained firing	IIIC	A. Use caution when removing hot barrel. B. Use protective gloves/clothing. C. Render first aid when required.	

SYSTEM: Artic M14 w/ suppressor SUBSYSTEM: _____ OPERATIONAL PHASE: All REVISION: _____		PRELIMINARY HAZARD ANALYSIS		ANALYST: _____ REVIEWER: _____ DATE: January 24, 2000 PAGE: 2 OF 2
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NO	HAZARD DESCRIPTION	CAUSE	HAZ CAT	HAZARD CONTROL	REMARKS
009	Debris striking shooter in eyes when firing the weapon full automatic with suppressor attached	Excessive gas released from weapon action through ejection port when firing weapon with suppressor attached in full auto mode	IIIC	A. Shooter should wear protective eyewear	This a common problem associated with the addition of a suppressor to a weapon increasing the amount of gas blown back on the shooter through the ejection port
010	Projectile lodged in bore	Second projectile fired prior to clearing bore.	IIID	A. Inspect weapon / barrel after firing any low report B. Personnel shall ensure the bore is clear after each firing. C. Drain weapon after exiting water.	